What is claimed is:

1. A pyrogenic oxidic powder composed of particles, comprising

(i) atoms of an element of groups 3A, 4A, 3B or 4B of the periodic table of the elements, and

(ii) oxygen atoms,

said particles being characterized by lithium atoms attached to said atoms via an oxygen bridge.

2. The pyrogenic oxidic powder of claim 1, comprising an oxide or mixed oxide of the elements silicon, aluminum or/and zirconium.

3. The pyrogenic oxidic powder of either preceding claim, wherein lithium is present at least on the surface of said particles.

4. The pyrogenic oxidic powder of any preceding claim, wherein lithium is present in the interior of said particles as well.

5. The pyrogenic oxidic powder of any preceding claim, having a specific surface area from 20 to 500 m^2/g.

6. The pyrogenic oxidic powder of any preceding claim, being substantially free of Li_2O.

7. A process for producing the pyrogenic oxidic powder of any of claims 1 to 6, comprising the steps of:

(a) providing a mixture comprising

(a-1) a lithium compound,

(a-2) a pyrogenic oxide or a vaporizable compound which forms a pyrogenic oxide in the presence of hydrolyzing and/or oxidizing gases by thermal decomposition, and

(a-3) optionally a solution or dispersion medium, and

(b) reacting said mixture at a temperature of not less than 50°C.

8. A process as claimed in claim 7, wherein said lithium compound is selected from lithium nitrate, lithium chloride, lithium carbonate, lithium acetate, lithium formate, lithium azide, lithium metal hydrides, lithium alkoxides or organolithium compounds.

9. A process as claimed in either preceding claim, wherein said mixture comprises a pyrogenic oxide, preferably of the elements silicon, aluminum or zirconium, and a solution or dispersion medium.

10. A process as claimed in claim 9, wherein said pyrogenic oxide is mixed with a solution of said lithium compound.

11. A process as claimed in claim 9 or 10, wherein said pyrogenic oxide has a primary particle size from 5 to 100 nm, preferably from 5 to 50 nm, and most preferably from 7 to 40 nm.

12. A process as claimed in any preceding claim, wherein said reacting is effected at a temperature from 50 to 450°C and preferably 100 to 350°C.

13. A process as claimed in any preceding claim, wherein the number of free OH groups is determined in said pyrogenic oxide and from 0.5 to 1.5 times and preferably from 0.7 to 1.0 times the stoichiometric amount of said lithium compound is used relative to said number of free OH groups.

14. A process as claimed in claim 7 or 8, wherein said vaporizable compound comprises a halide, a hydride, an alkoxide or an organometallic compound.

15. A process as claimed in claim 14, wherein said reacting is effected as a high temperature hydrolysis.

16. A process as claimed in claim 14, wherein said high temperature hydrolysis is effected at a temperature of more than 200°C, preferably more than 800°C and most preferably more than 1 000°C.

17. A process as claimed in any of claims 14 to 16, wherein hydrogen- and/or oxygen-containing gases are present.

18. A pyrogenic oxidic powder obtainable by any of claims 7 to 17.

19. The use of the pyrogenic oxidic powder of any of claims 1 to 6 or 18 for producing a separator for an electrochemical cell.

20. A separator for an electrochemical cell, especially for an electrochemical cell where lithium ions are passed through said separator in operation, characterized by said separator containing the pyrogenic oxidic powder of any of claims 1 to 6

or 18.

21. A separator as claimed in claim 20, comprising a polymer electrolyte.

22. The use of a separator as claimed in claim 20 or 21 for producing an electrochemical cell, especially a lithium battery, lithium ion battery or a lithium polymer battery, each preferably for high energy and/or high power applications.

23. An electrochemical cell, especially a lithium battery, lithium ion battery or a lithium polymer battery, wherein said cell comprises a separator as claimed in either of claims 20 and 21.